

The media and the social construction of the environment

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Media-related research on environmental issues has followed much of the same path as media and communication research on any other social problem or issue. It is not surprising, therefore, that such research embodies many of the same weaknesses of communication research generally. Most notable among these is a root problem of looking at the communication process from a linear transmission or diffusion-oriented perspective. This attempts to trace the influence of media coverage on public opinion, or the influence of media coverage on political decision-making, without due appreciation of the dynamic interaction of these different fora of meaning production, and without due recognition of the wider cultural context of definitions of the environment.

Analysis must start by noting the relatively recent emergence — in the 1960s — of the environment as a problem for public and political concern, and the considerable ‘ups’ and ‘downs’ experienced by environmental issues in the media and wider public agendas over the last 25 to 30 years. Perhaps more than anything, this leads us to appreciate that while some of the most common approaches adopted in studies of the mass media and environmental issues can help explain particular aspects of the communication process, they have difficulties explaining why the environment becomes a prominent problem for public concern at certain periods in history.

Just as it would be a mistake to assume that the jump to the forefront of media, public and political agendas of environmental issues in recent years is a simple reflection of a sudden deterioration of the environment, so too would it be misleading to assume that those environmental issues which figure prominently in media and political agendas are necessarily the most

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immediately threatening or serious (as defined for example by scientists or environmental activists).

It is the key argument of this article that, if we wish to understand the role of the mass media in the development and the elaboration of environmental issues, we must turn to a constructivist framework, which (a) abandons a linear notion of problem development, including the role of communication processes therein, and (b) recognizes the importance of cultural resonances in the privileging of some issues over others.

The problem of 'public opinion' and media coverage of the environment

There is a comprehensive literature on public opinion and attitudes on environmental issues (Murch, 1971; Trop and Roos, 1971; Erskine, 1972; Van Liere and Dunlap, 1980; Anthony, 1982; Keeter, 1984; Kessel, 1985; Gillroy and Shapiro, 1986; Heald and Wybrow, 1986; Lowe and Rudig, 1986; Young, 1990), most of which suggests that public awareness and concern about the environment developed during the 1960s and reached an initial peak around 1970, then fell back during the 1970s. Recent studies indicate that public concern about the environment has been on the increase since the mid-1980s (see Young, 1990).

Similarly, there is a growing body of research on media coverage of the environment and environmental issues which, along the same lines as the research on public opinion, suggests that the environment first became a subject of media coverage in the 1960s, that such coverage grew to an initial peak around 1970, and then receded to a higher-than-early-1960s plateau (Funkhouser, 1973a; Sellers and Jones, 1973; Brookes et al., 1976; Parlour and Schatzow, 1978; Strodthoff et al., 1985). As with the suggestion on public opinion, recent analyses of media content and of media organizations have noted that, following a decline in environmental coverage in the mid-1980s (Merriam and Makower, 1988), there has been a relatively dramatic increase in media interest in the environment during the late 1980s and 1990 (Love, 1990; Starke, 1990; Stocking and Leonard, 1990).

Against this background it is not surprising that several studies have attempted to uncover links between general public opinion on the environment and media coverage of environmental issues. Funkhouser (1973b), in an early study of the relationship between the media prominence of certain issues and their prominence in opinion polls, found an intriguing correlation. On the whole, the rank order of issues in media coverage and the importance ascribed to those issues in opinion polls, including environmental concern, matched each other well.

Funkhouser, however, goes on to cast doubt on whether it is possible,

from this 'match', to make any inferences about the impact of media coverage on public opinion; specifically, he argues that the match may simply be an indication that everybody engages in 'indirect content analysis', and that the 'concern' measured by opinion polls is no more than an indication of people's general awareness of what the media define as issues for public concern.

This point has been restated more recently by Lowe and Rudig who, in a wide-ranging review of evidence on public opinion and attitudes on environmental matters, point out that longitudinal and more comprehensive surveys have shown a relative stability as well as ubiquity of environmental concern. They suggest that the fluctuations registered by more superficial opinion polls may merely reflect 'the immediately prevailing preoccupations of the mass media' (Lowe and Rudig, 1986: 514).

The futility of attempting to relate public opinion on environmental issues to mass media coverage arises perhaps primarily from the simple point that this amounts to relating two macro-categories which, because of their sheer macro-ness, obscure more than they reveal. Not only does the notion of 'environmental issues' coverage comprise both media genres and issue topics which are very diverse but, equally, the notion of a general 'public opinion' on environmental matters may have little analytical, let alone explanatory, power. The diversity of 'environmental publics', and of experiential and other factors in the formation of such publics, has been well documented in a range of studies. Van Liere and Dunlap for example, have argued, on the basis of their attempt to distinguish common demographic trends among publics concerned about the environment, that researchers should focus attention on specific environmental issues and policies, instead of lumping 'such diverse issues as air and water pollution, population control, and wildlife protection together into global measures of environmental concern' (1980: 193).

A starting point for many discussions about media roles in relation to public awareness and concern about the environment is the observation that the mass media, and television in particular, serve as a primary source of information (Murch, 1971; Atwater et al., 1985; Wilkins, 1987). Following classic communication research (Klapper, 1960), the argument about possible media influences extends along the lines that on a wide range of environmental issues the public would have few sources other than the mass media to turn to for information.

Following this line of argument, several studies have found agenda-setting effects in the relation between media coverage and public opinion on environmental issues (Atwater et al., 1985; Iyengar and Kinder, 1987; Brosius and Kepplinger, 1990). Atwater et al. (1985) found weak, but positive, correlations between the media prominence of six environmental issues and the relative importance assigned to those issues by the public. Interestingly, and confirming Funkhouser's point (see above) about the

difference between 'awareness of media agendas' and 'actual public concern about environmental issues', Atwater and his colleagues found strong evidence of public awareness of what the media agenda on the six issues was.

Brosius and Kepplinger (1990), in a complex agenda-setting study in Germany, similarly found evidence of relatively strong agenda-setting effects on the issues of energy supply and environmental protection. They also, however, note some of the complexities in interpreting the findings arising from their research: they note for example the very different agenda-setting time-scales applying to the development of general perspectives such as environmental protection, compared with awareness of specific events within a wider issue (the example they use is the Chernobyl accident as a specific event within the wider issue of 'energy supply').

In contrast, in another tightly designed agenda-setting study, Protess et al. (1987) found little evidence of any agenda-setting effects of toxic waste coverage on public opinion. They did, however, find that such reporting had significantly influenced the attitudes of policy-makers. It is this latter finding which singles out the study by Protess et al. as particularly interesting because it gives a brief glimpse into the elaboration of particular environmental concerns in the interaction between two key fora of meaning production, the media and public authorities. While limited in its objectives, and certainly adhering to a transmission model of communication, the study indicates some of the interactive process through which certain concerns are promoted. Specifically, they draw attention to 'agenda-setting' processes between powerful institutions, rather than between the media and that much more diffuse construct, 'the public'.

While important in the sense that they indicate some of the ways in which media coverage may help influence the priority ascribed to different social issues by the public, these agenda-setting studies do not go far beyond showing just that. Thus they do not reveal much, if anything, of the complex ways in which different publics negotiate and interpret the environmental meanings offered by media coverage (see Corner et al., 1990; Burgess, 1990). Nor can they show whether media coverage of environmental issues serves as a resource for a wider understanding of the relationship between socio-political practices and environmental degradation.

Because their starting point is a search for media *influence* on public opinion, this is essentially what they end up finding. And in this respect they repeat a transmission view, in which it is assumed that environmental meanings flow from certain sources through the media to the wider public. They share this problem with other more complex analyses of the emergence and elaboration of the environment as a problem for public and political concern.

The 'flow' of environmental problem definitions

In a seminal article published in 1979, Schoenfeld et al. survey the role of the press in the construction of the environment as a social problem. Despite their emphasis on a constructivist perspective, their analysis does, however, carry an underlying view of mass communication processes as linear, flow or transmission oriented.

They note, for example, various information diffusion models which map the flow from 'claims-makers to the communications subsystem and thence to the public and the government' or (quoting Tichenor et al., 1973) "from professional and interest group concern through independent publication and attention in government to mass media attention and public concern" (Schoenfeld et al., 1979: 47). A similar diffusion perspective forms the key frame in a study by Strodthoff et al. (1985), in which the rise of environmental ideology is seen as the flow of environmental concern from scientist claims-makers, through special interest magazines, to wider general interest magazines and on to the wider public.

The essential problem with these linear, diffusion, models of communication and of the construction of the environment as a social problem is that, in their pursuit of linearity, they gloss over the interactive nature of meaning construction among and between institutions in society. Hilgartner and Bosk (1988), in their criticism of 'natural history' models of the evolution of social problems, aptly point out that:

the idea of an orderly succession of stages [in the development of social problems] is . . . crude. Many problems exist simultaneously in several 'stages' of development, and patterns of progression from one stage to the next vary sufficiently to question the claim that a typical career exists. . . . Second, the focus on the typical career of a problem hinders analysis because interactions *among* problems are central to the process of collective definition. (Hilgartner and Bosk, 1988: 54-5; emphasis in original)

The difficulties which arise from the pursuit of linear processes are illustrated by the fact that, even within the relatively limited field of research on the social construction of environmental issues, it is possible to find studies which contradict each other in terms of the direction of influence which they trace. Thus, where many studies have attempted to identify the influence of media coverage on public opinion (see above), Lindahl (1983), for example, in his analysis of media coverage of nuclear power in Sweden, argues that journalists basically responded to their perceptions of the public mood on nuclear power and attuned their coverage accordingly.

Because of their focus on linearity, and as products, to some extent, of

the 'transmission' model of communication which underpins them, these studies tend to overlook the view that the social construction of environmental issues cannot be reduced to a question of information flowing from certain 'source' institutions through the mass media to a wider public and to other institutions. Gamson and Modigliani's (1989) concept of 'parallel systems of meaning production' and of the elaboration of certain issues as a 'value-added' process, rather than a linear process with dependent and independent variables, offers a particularly attractive alternative. What this allows us to appreciate is that while original claim-making about a social problem may start in one particular forum (notably, in the case of environmental issues, in the science forum), the growth and inflection of such a problem takes place through complex interaction, involving influence and feedback processes, between a number of key fora. Drawing on a series of careful case studies of environmental controversies, Krinsky and Plough (1988) reach a similar conclusion:

Risk messages emanate from different sources through formal and informal channels. This is not a novel discovery in itself, as most discussions of risk communication recognize the importance of multiple audiences and acknowledge that the public is a highly diverse aggregation of individuals. However, beyond the diversity of the audience, multiple generators of risk information — including nonofficial sources — play a key role in the overall risk communication scenario. Moreover, our analysis suggests that risk communications in their social context resemble tangled webs, in contrast to a parallel series of sender/receiver interactions. (Krinsky and Plough, 1988: 298)

News construction perspectives

Many studies have noted the particular problems facing environmental issues in terms of becoming part of the media agenda. Early studies tended to focus on the absence of an environmental beat (i.e. there was no established news-net [Tuchman, 1978] to catch these kinds of issue), and on editorial attitudes to covering environmentalism. The latter included basic problems in understanding what 'environmentalism' was about, and the concerns of editors and media proprietors that some kinds of environmental coverage had the potential to antagonize powerful industries and businesses, whose advertising the media depended on. Schoenfeld et al. (1979) and others have also noted that the time-scale of most environmental problems and issues does not fit easily with the 24-hour cycle of news production.

Although all of these explanatory foci have something to offer toward an understanding of the construction and elaboration of environmental issues in the mass media, some apply rather more to the early days of environmental coverage than to the present. Thus, most 'quality' media

and a number of 'popular' media now have a designated environment news-beat (Love, 1990) staffed with an environment reporter (or in some cases, several reporters).¹

Similarly, the alleged mismatch between the time-scale of environmental issues and that of news production seems, at least partially, to be contradicted by the relative prominence enjoyed by such 'slow-onset' problems as ozone-depletion (see, for example, Nelkin, 1987), the greenhouse effect and perhaps most significantly, any environmental matters potentially or provenly associated with cancer. The prominence of such issues indicates that, rather than focusing on the time-scales of individual environmental problems in relation to a conventional notion of news value, it is necessary to focus on claims-making activity in relation to environmental issues and, crucially, to focus on the way that the mass media interlink with the societal fora in which such claims-making activity takes place.

At the heart of this is the seemingly self-evident assumption that environmental issues do not ordinarily articulate themselves. By 'not ordinarily' I simply wish to draw a distinction between the environment as violent 'accident' or 'disaster' which by its sudden, unexpected and visible nature forces itself onto the media agenda and, on the other hand, environmental 'issues' which by having none of these characteristics (or at least not all of them in combination) only become known because someone makes claims about them.²

'The collective definition of social problems occurs not in some vague location such as society or public opinion but in particular public arenas in which social problems are framed and grow' (Hilgartner and Bosk, 1988: 58). Understanding media roles in the construction of the environment and environmental issues as social problems is therefore not primarily a question of determining whether media coverage influences public opinion, or public opinion influences media coverage. Rather it becomes a question of mapping the dynamic and interactive elaboration of issues as they are articulated, often in parallel, in different fora of meaning creation, bearing in mind that such fora are hierarchically ordered, and that the 'strength' of their interlinkages varies. Thus, in the articulation of environmental issues, there can be little doubt that the forum of formal political activity is near the top of the hierarchy, together with the scientific community and, to a lesser extent, the courts. It is also clear that the strength of 'linkages' between these fora and the media is more emphasized than that between the media and environmental pressure groups.

Studies of media coverage of environmental issues have repeatedly shown that it shares much of the 'authority-orientation' of other types of coverage, and that environmental pressure group organizations and environmental activists do not fare well as 'primary definers'.

Einsiedel (1988), in her analysis of the Canadian press, found interest

group representatives greatly outnumbered by government officials, scientists and private industry as sources used in coverage of environmental issues. Greenberg et al. (1989), in their analysis of television coverage of environmental risk, found that government and industry accounted for 28 percent and 13.2 percent of sources respectively, while advocacy groups were only 6.8 percent of sources. In a comparative study of news coverage of environmental issues on British and Danish television, Hansen (1990a) found that environmental groups appeared as primary definers in only 6 percent of stories, compared with 23 percent for public body or authority representatives, 21 percent for government, and 17 percent for independent scientists or experts.

Similar patterns have been found in analyses of coverage of specific environmental disasters or events (Molotch and Lester, 1975; Nimmo and Combs, 1985; Wilkins, 1987; Patterson, 1989).

While quantitative analyses of the different 'voices' represented in media definitions of environmental issues form a useful starting point for understanding the wider public inflection of such issues, the traditional notion of primary definition (Hall et al., 1978) suffers from several problems. Most notably, this type of analysis does not normally distinguish between the potentially very different messages that come from the same group of primary definers, nor does it indicate the varying degrees of 'legitimacy' with which different primary definitions are accredited. For example, Nimmo and Combs (1985) noted that 'average citizens' were generally prominently represented in television coverage of the Three Mile Island accident, but that the narrative uses of 'average citizens' were very different from network to network:

The CBS citizen interview normally involved persons expressing confidence in how things would turn out (for example, expressing appreciation for President Carter's visit to Middletown). ABC's average citizen interviews focused instead upon personal fears and anxieties. (Nimmo and Combs, 1985: 81)

Similarly, it has been suggested (Hansen, 1990b) that in order to understand the relative 'weight' carried by different types of primary definers, it is necessary to take into consideration the newsmaking scenarios through which such primary definers become newsworthy and articulate their claims about the environment. Thus, there is some indication that when environmental pressure groups do appear as primary definers, they do so primarily through the forum of 'demonstration or public protest action' — a forum which carries considerably less 'legitimacy' in Western democracies, than the forum of 'formal political activity/parliament' or the forum of 'science'.

In terms of understanding the particular role of environmental pressure groups in drawing attention to environmental problems, and in pushing environmental concerns higher up on the media agenda, however, it may

be necessary to introduce at least one further distinction. This is a distinction which takes into account that the role of pressure groups, including their role in relation to media coverage, changes with different phases in the career of particular problems. Thus, there is a difference between the attempts of pressure groups to direct public and political attention to an issue which currently is either not in the public eye at all, or one which has only a very low profile, and, on the other hand, the role of pressure groups as 'responders' to claims made about environmental issues in other key fora (e.g. the political forum or the science forum). In the former situation, pressure groups must rely heavily on the forum of 'public demonstration or protest action' for media coverage (Molotch, 1979; Gitlin, 1980; Greenberg, 1985; Kielbowicz and Scherer, 1986; Brown and May, 1989; see also Hansen, 1990a), whilst in the latter case they may be given the mantle of legitimacy normally associated, in media coverage, with the fora of 'public authorities', 'government' and 'science'.³

That the role of pressure groups in the elaboration for media and wider public attention of certain environmental issues may be considerably more complex than is suggested by their low profile in actual media coverage has been indicated both theoretically (Schlesinger, 1990) and empirically in studies of environmental journalists. Thus, both environmental reporters and other reporters who cover environmental issues tend to be positive toward the role of environmental groups as news sources (Lowe and Goyder, 1983; Lowe and Morrison, 1984; Porritt and Winner, 1988; Anderson, 1991; Hansen and Linne, 1991), albeit with clear hierarchies of credibility in their perception of different pressure groups, and tempered by the basically cautious/critical frame with which they regard information from *any* campaigning body. The low profile of pressure groups as primary definers in actual media coverage indicates that, while they may play a key role as claims-makers, drawing the attention of the media to particular environmental problems, it is to the fora of 'public authorities', 'formal politics' and 'science' that journalists turn for validation of such claims. Consequently, both continued media coverage and the wider elaboration of certain environmental problems hinge crucially on the extent to which they become part of, and articulated through, the agendas of these other 'established' fora.

Cultural resonances in the production of environmental issues

If traditional approaches to the study of media and news coverage can throw some light on the relationship between the immediate actors involved in the production of such coverage, it is to the wider notion of cultural resonances that we must turn in order to account for the very different careers of various environmental problems.

Schudson (1989), Gamson (1988) and Hilgartner and Bosk (1988) have all argued for the importance of complementing traditional organizational perspectives on media coverage and news production with a wider view which takes into consideration how the 'cultural givens' of society both facilitate and delimit the elaboration and coverage of issues. In order to gain prominence in the public sphere an issue has to be cast in terms which resonate with existing and widely held cultural concepts (Gamson and Modigliani, 1989).

Among the 'cultural givens' within which much media reporting on the environment is anchored are the beliefs in 'mastery over nature' (or 'nature as object', see Evernden, 1989) and in 'progress through science and technology'. Both of these may help explain why media discourse on the environment is to a large extent a 'science' discourse drawing on scientists as the primary arbiters of right and wrong, true and false, real and imagined.

A potential problem in pinning down, for analytical purposes, the wider notion of 'cultural givens' is the simple observation that for each cultural theme there is a counter-theme (Gamson and Modigliani, 1989). Thus, while Western thinking about the environment may be dominated by belief in mastery over nature and in progress through science and technology, man-made environmental disasters almost by default, as Lowe and Morrison (1984) argue, serve to question this notion of progress.

This observation, however, does not render the plea for an understanding of 'cultural givens' in the analysis of news production and media coverage invalid. Thus it would be difficult to account for the very different media inflections of the Three Mile Island and the Chernobyl nuclear accidents purely in terms of organizational structures, professional values of journalists, or source-communicator relationships. Both Patterson (1989) and Luke (1987), albeit from rather different points of departure, have demonstrated how the reporting in American mass media of the Chernobyl accident was circumscribed by, and inscribed itself in, the then dominant Cold War ideology:

In a mass society, with its competing values, individuals depend on . . . underlying myths to explain the interaction between technology and the larger culture. The Chernobyl story provided an almost ideal opportunity for the 'retelling' of such a mythical tale — the integrative propaganda of the superiority of American technology disconnected from the risks such technology had just as obviously brought the Soviets. (Patterson, 1989: 133)

Similarly, it would be difficult to account for the media coverage of the Bhopal poisonous gas disaster of 1984 without drawing on cultural beliefs about Western technology in a Third World context. At its most simple level this invokes a view of Western technology as dangerous when left in the (implied) incompetent hands of the Third World. As in the media

construction of the Chernobyl accident (see Patterson, 1989) this is a perspective which marginalizes the notion that any highly technological system is dangerous and prone to 'normal' accidents and steers the audience in the direction of the notion that such systems become dangerous only when 'not handled properly'. As Wilkins points out, in technological accidents 'the accidents themselves are wrenched from underlying technologies. They become disasters rather than the predictable malfunctioning of complicated systems' (Wilkins, 1989: 172).

At the most general level, media coverage of Bhopal resonates with and reaffirms the myth (perpetuated by the general nature of Western news coverage) of the Third World as a 'place' of random large-scale disasters. What is crucially missing from this myth is, of course, a perspective which places such disasters within their wider context of, in this case, post-colonial development policies, of Third World dependency on Western technology and capital, and of the advantages for Western companies of less regulation and the abundance of cheap labour in the Third World.

The notion of 'cultural resonance', as a contribution to understanding why some issues gain currency in public and media debate more easily than others, can be extended further to include questions about the ease with which some issues link into powerful, historically established, symbolic imagery. This marks out 'nuclear power and radiation-related issues' from some other environmental issues (e.g. deforestation, 'lead in petrol'). Patterson (1989) for example, drawing on psychological and risk-studies, notes the deep-seated public fears ('Atom-Angst') associated with anything nuclear. Others have pointed to the powerful and deep-seated images of mass destruction associated with the use of nuclear bombs in the Second World War. Spencer Weart (1987, 1988), in an impressive historical analysis of the origins and inflections of 'nuclear images', traces the fear and angst-ridden imagery much further back to the discovery of radiation, to 'alchemistic' connotations associated with the new science of atoms and nuclear radiation, and to the key theme of 'mutation/transmutation'.

Not all environmental issues or problems engage with, or 'benefit' from, a culturally deep-seated imagery of the same symbolic richness as 'nuclear and radiation-related issues', and they are disadvantaged by this in competition for elaboration in media and other meaning-creating fora. But it is precisely the extent to which they can be anchored in and made to activate existing chains of cultural meaning which helps determine whether they become part of media coverage and wider social elaboration.

Conclusion

An attempt at understanding the role of the media in the development of environmental issues for public and political concern calls for a perspective

which goes beyond — without ignoring the contributions of — traditional approaches to the study of mass media. Agenda-setting studies, diffusion studies, public opinion and media influence research, and studies of media organizations, of the professional values of media operatives, of source-communicator relationships in news production have contributed in various ways to our understanding of 'mass media and environmental issues'. But because of their media-centredness they are not, on the whole, capable of explaining why media (and to a lesser extent, public) concern about environmental issues fades in and out of focus, or why certain issues come to enjoy prominence while other, equally 'serious', issues fall by the wayside.

It is to a larger constructivist framework, and the conceptualization of the media therein, that we must turn for a more holistic view of media roles in the construction of social problems. Because of the focus on 'social problems' rather than 'media', such a framework enables a recognition of the interactive and parallel, rather than unilinear, processes which characterize the emergence and growth of environmental issues as issues for public concern and political action. It also facilitates an understanding of media coverage of environmental issues which goes beyond the (ahistorical) focus on the immediate actors involved (scientists, politicians, pressure group activists, journalists) to consider how the wider 'cultural givens' and 'cultural resonances' help privilege the advancement of some issues and not others.

Notes

1. While the establishment of environmental news-beats may mean that 'environmental issues' stand a better chance of being reported, it is not, however, clear to what extent this organizational restructuring has meant a significant qualitative change in the type and range of issues reported (Hansen, 1991).

2. This distinction must be regarded as tentative and flexible rather than clear-cut. The elasticity of definitions of 'disaster' in relation to media coverage is well put by Nimmo and Combs, who argue that

it is not always clear when a disaster has occurred. The devastation wrought by a hurricane or flood, loss of life and property during warfare, the strewn bodies of victims of air crashes — all are clear indicators of disastrous events. But sometimes no readily observable evidence is at hand. Consider the escape of toxic gasses from a waste disposal plant or industrial complex. Effects on humans, plants, and animals in the environs may go undetected, yet occur in critical proportions. (Nimmo and Combs, 1985: 11)

Although some environmental disasters, particularly but not only natural disasters, happen wholly unenvisioned by the media or other discourse fora, their interpretation is essentially a social construction. Thus, though the damage wrought by

storms and flooding in Britain is clearly not the result of any claims-making activity, the meanings and significance assigned to such damage in terms of 'human tragedy', 'damage to business', 'inadequate forecasting technology and expertise', 'the government's response (aid, compensation, etc.)', 'the performance of emergency services' etc. are very much media and social constructions.

3. This may explain why at least one study found pressure group representatives to play a prominent primary definer role (MacGill, 1987). It also ties in with widely held journalistic notions of pressure groups as a 'useful' and easily accessible source for providing 'counter-balancing' comments in response to claims-making by industry, government, or indeed, science (Greenberg, 1985).

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